God and the Devil

God is always right, and Germany is always right; therefore God is a German.

—"Bill the Baby Killer," in *Black and White.*

The Russian Church Is Weakened, Not Purified

THE Orthodox Russian Church is now probably passing through the most crucial period of its history, according to C. Zvegintsov, writing in "The New Europe." In the face of the recent Bolshevist decree separating Church and State in Russia, the writer wonders whether the Church may not perish, or whether it will emerge "weakened numerically and materially, but purified and regenerated by the fiery trial and strong with 'the strength of ten, because its heart is pure.'" The article, which gives a noteworthy review of the causes leading up to the present situation, follows in part:

"The revolution of 1917 liberated the Church from a two centuries' oppression and suppression. The provisional government, granting freedom of conscience and of worship, announced the convocation of the All-Russia Church Assembly. A great wave of revival swept through the Church. It was like a breath of fresh air in the close atmosphere of Church life. Local Church councils met in nearly all dioceses, and clergy and laymen for the first time after many years discussed in common questions of church and parish reform, and drew up instructions for their delegates to the All-Russia Assembly.

"The metropolitans of Petrograd and Moscow and several diocesan bishops were elected by suffrage, laymen taking part in the polling, thus opening a new era in Russian Church life. All the newly elected were already ordained bishops, but in Moscow a strong current had manifested itself for the election of a well known and popular lay Church worker, and only his repeated and decided refusal prevented his becoming Metropolitan.

"At last the All-Russia Church Assembly was opened with great solemnity on August 15-28, in the ancient historical Uspenski Cathedral in the Kremlin. A special service was celebrated, at the end of which the Creed was chanted by all the members. Deeply impressed by the great task that lay before them, the members of the assembly, gathered from all parts of Russia, before settling down to work undertook a solemn pilgrimage to the famous Troitsa Monastery, near Moscow, to invoke the blessing of Saint Sergius, 'the great interceder for the Russian land.' After the preliminary stage of organization was passed three distinct currents became manifest throughout the debates.

. . . . . .

"The restoration of the patriarchate was advocated as a return to the early traditions of the Eastern Church, which always admitted of a spiritual head of the Church, though by no means in Roman Catholic sense. The danger of the patriarchate becoming a source of ecclesiastical despotism and reaction should be averted by the creation of a permanent church council, elected by suffrage from among both clergy and laity. Periodical assemblies should be convoked to discuss important problems and vital needs of church life. Fundamental reforms and reorganization of the parish were included in the programme, giving full scope for public initiative and self-government. What would have been the development of these reforms under normal conditions of social life it is difficult to say. But time and tide wait for no man, nor does a revolution. The relentless tide of events rolled on, sweeping away old forms and institutions.

"The heavy guns boomed out the proclamation of civil war in Moscow during the election of the patriarch. All lands belonging to the churches and monasteries were confiscated shortly after, and the publication of the decree for the separation of Church and State is probably a matter of the immediate future.

"Thus has the Church passed without transition from the sheltered harbor of government protection straight into the very heart of the storm."

Standing Like Peter

"PETER Stood and Warmed Himself" is the title of an article by George Parkin Atwater published in "The Atlantic Monthly," in the course of which the writer says:

"The Church has many problems. It is honeycombed with individualism and imperilled by divisions. It must work out its own salvation. But when it comes to issues of right and wrong, the Church takes its place with right. The Church in our land stands—as Peter stood of old—first, to let conscience speak and to struggle against the instincts of peaceful habits, and then it goes, sword in hand, committed to a struggle, to war—a war of no compromise, of artful evasion of a decision, but a war to victory.

"To-day the duty of the Church is slowly getting a different emphasis. Standing as Peter stood, debating with conscience the value of peace, the Church must and will set its face against the moral iniquity, the utterly unpardonable desertion of its cause, of concluding a peace based on any other consideration than the complete mastery and dissipation of every evil organization or movement of government which has shown itself to be the cruel and heartless foe of humanity. Better that every man in America should go to the plains and farms to wrest again his living from the soil, as our forefathers did, better that every woman should turn again to spinning wheel and churn, better that every vestige of our material civilization should be swept away, than that we should compromise this issue between righteousness and evil. Now is the time for the Church to awaken to its new peril of bankruptcy and demolition, unless it begins at once to speak, as it has spoken for war, for the complete and final and overwhelming victory for righteousness, which alone will save mankind from a moral decay more fatal than death."

Around the World and Back Again

Seeing Things in Peking

A WRITER signing himself simply R. L. contributes to "The Theosophical Path" the following picture of street life in Peking:

"To walk through the streets of Peking and see the ever changing aspects of their teeming crowds of good natured humanity is a fascinating pastime. In the main the thoroughfares are spacious, but in consequence of the practice of bartering in the streets rather than in the shops the space left for traffic is narrowed to a road in the middle just wide enough for two vehicles to pass.

"If we stand a few minutes on the edge of the crowd we may see such sights as a funeral procession headed by paid mourners dolefully lamenting the dead, followed by chicken coops and the coffin slung from poles borne on the shoulders of pallbearers, with the family and friends of the deceased bringing up the rear, garbed in pompous or uncouth array, according to their station; perhaps following this will be a wedding procession, with the bride's closed red sedan chair, in front of which is borne the roasted pork to propitiate evil spirits, and accompanying her are gifts of fruit, furniture and domestic articles of all kinds, while the procession marches to the tune of what seems to our ears anything but music; a troop of dromedaries laden with coal from Tartary may be next in line, and a company of Manchu soldiers will possibly follow in their wake and the trailing cloud of dust; while scattered in between there will be wheelbarrow and pushcart venders of vegetables or what-not pushing their unwieldy appearing vehicles, or else coolies carrying nondescript packages of merchandise swung from either end of a long pole borne on their shoulders; and there will likely be an occasional sedan chair of some mandarin borne by two, four or eight retainers.

"Meanwhile, beside us and around us, and on both sides of the street, there is a dense mass of humanity selling and buying, bartering and bickering, every one talking at once, so that the resulting babble could hardly be exceeded.

"Besides the merchants vending their wares, we are surrounded by jugglers and conjurers and acrobats, quack doctors and comedians, itinerant cobblers and menders of everything under the sun, peripatetic barbers, men playing battledore with their feet, others flying kites in rivalry or shooting with the bow and arrow. In addition to merchants offering the customary articles of commerce, there are also pastrymen, cooks, fruiterers, bankers, apothecaries, herb venders, booksellers, fortune tellers, each with his table or stall or little space of ground disposed along either side of the street in front of the shops proper, every one eager to 'catch a little pigeon.' Indeed, most of the business is transacted in the open air. By day the shopfronts are thrown open, and projecting roof or awning protects the merchandise from sun or rain."

Revolution in Nipponese Living

IN "THE JAPAN MAGAZINE" appears an article by A. Yamaguchi, dealing with the changing aspect of domestic life in Japan, especially as regards "matters of food, clothing and houses." Japan, he writes, is in need of reform in regard to food. As a matter of fact—

"it is well understood that the health and efficiency of a people largely depend on the quality and quantity of the food available. The fact that the Japanese take rice instead of bread, and fish instead of meat, does not necessarily mean that their food is less nourishing than that of Western people. The staple food of Japan is as economic and nourishing as the people need; but the need of improvement in the cooking of it is great. The present method of cooking rice is by washing it in cold water and then boiling it, each family boiling just sufficient for its daily needs. Thus an immense amount of time, labor and fuel is wasted by adhering to the ancient mode of cooking. The habit of cooking for every meal may be due to the climate, which does not allow food to be kept long without eating; and Japanese rice and vegetables when once cooked, unlike Western bread and biscuit, must be eaten at once. Therefore it is very important that the Japanese should learn how to turn their rice into bread so as to avoid the necessity of frequent cooking."

Next there is the question of clothes. Of course, he admits—

"our mode of dress is highly admired by some foreigners, and held to be particularly well adapted to the Japanese figure and physique, as the kimono is loose, flowing and graceful as well as dignified; but at best it is the dress of the man of leisure, and very ill adapted to active vocations. It is, in fact, a most unbusinesslike costume. And now that Japan aims to be one of the most progressive of industrial nations the native kimono is sure to be less and less in evidence among the workers and directors of industry. Japanese laborers have never attempted to wear the kimono, their dress being more like a tight fitting Western underwear, while many of the higher middle class people now wear foreign dress. Among the lower classes the kimono is adopted only as the dress of holidays and times of leisure. The above remark applies, of course, to men; for the women of Japan, of whatever class, have always clung to the graceful kimono as well suited to their taste, though when they are engaged in rough labor their kimono is greatly modified in form, especially in the sleeves. The middle class, who wear foreign dress in daily business and native dress in the evenings at home, find it most expensive to keep supplied with two sets of clothing. Thus for the lower classes and the middle class a reform of clothing, rendering it less costly, is immediately pressing."

As concerns dwellings, he continues, there are two questions of immediate importance:

"The first is concerned with the structure of the Japanese house, and the second with the seating conveniences of the home. It must be admitted that the structure of our houses is in some ways rather rough and primitive, yet in other ways it is very cheap and artistic, especially in the interior. But it is unable to endure the stress of violent storms, such as frequently visit Japan, and its frailty exposes it to conflagrations that often lick up our matchwood villages and towns like so much paper. A Japanese city would have no chance of escape from an enemy aeroplane; since it would be set on fire at once. This lack of resistance to fire and storm is a great deficiency in the native dwellings of Japan. How to remedy the defect is a grave question; for the employment of brick or stone in the construction of houses is too expensive for the average citizen of Japan. In any case the Japanese are not yet capable of living in European style houses comfortably and in a sanitary manner.

"The climate of Japan is very destructive to stone and marble; and the native houses are built as a temporary measure, having to be renewed every few years. It is, however, much easier to rebuild of wood than of stone or brick. Consequently the wooden house is still best adapted to the circumstances of Japan, as the experience of many centuries has proved. Ground is expensive and the small proportions of the native house allow the best economy of site. But large buildings, like schools, hospitals, barracks and business houses, that occupy much space, are usually constructed in Western style of architecture, though usually of wood, as being less expensive. Ugly semi-foreign structures are also beginning to mar our towns and cities, especially in the suburbs.

"The old native custom of always squatting down on the tatami floor of the house is now fast giving way to the use of chairs, though among the poor the old habit still almost universally prevails. The Japanese sit on the mats during periods of rest at home in the evenings, but during the time of labor and of general business they are always standing or else seated on chairs in their offices. Thus sitting on the floor really occupies but a small proportion of the working time, or of the actual lifetime, of the Japanese. It is, therefore, quite a mistake to suppose, as some Western folk do, that the Japanese spend most of their time squatting on the floor."

The Navy Takes a Lesson in Pie-Making

Photo © Western Newspaper Union, from *World Outlook*

MRS. MARY WILSON and some of the members of her cooking class in the Philadelphia Naval Home. Mrs. Wilson, who once upon a time was Queen Victoria's cook, organized her first class of thirty-three men early last June, and in five weeks the men were ready to put to sea as competent, scientific cooks.

Spiders on the Wire!

DURING the dry season in Argentina a certain species of spider's webs collects on the telephone and telegraph wires in enormous quantities. As soon as the sun sets they become soaked with dew and cause short circuits between the wires. Eleven pounds weight has been swept from four wires over a distance of six miles.—*Popular Science Monthly.*

Medicine and Surgery

The Race Between Poison Gases and Masks

TO THE lay mind all poison gases are much the same. The chemist, however, knows that there are a great variety of these gases that may be employed in warfare, each requiring protection by a special mask. An article in the April number of "Drug Topics" gives some idea of the ingenuity that has been devoted to this form of deviltry. After describing the first gas attack before Ypres in April, 1915, which, had the Germans but known it, opened an unobstructed gap in the Allies' lines, the article describes the contest between poison and antidote:

"Before weather conditions were again favorable for another attack British chemists improvised gas masks to protect the 'Tommy,' consisting of respirators with pads of cotton and wool wrapped in muslin and soaked in solutions of sodium carbonate and thiosulphate.

"Finding that their chlorine was no longer effective against the English masks, the Germans next introduced phosgene gas, more deadly than prussic acid and more insidious than chlorine. This the British met with a new gas helmet soaked with sodium phenate.

"It now became a chemists' war. Next the Germans developed a more concentrated form of phosgene gas, many times more deadly than their original phosgene. From Russia came the tip how to overcome this through the use of hexamethylenetetramine (urotropine) (CH2) 6N4. Used in conjunction with sodium phenate, this protected against phosgene at a concentration of 1: 1000. An excess of sodium hydroxide was used with the sodium phenate and a valve was provided for the escape of exhaled air.

"Following this German chemists perfected their celebrated tear shell made of xylyl bromide or bromide benzyl, made by brominating the higher fractions of coal tar distillates. A concentration of 1 part in a million of this lachrymator makes the eyes water so severely that the victim can hardly see. In an attack on the French the Germans cut them up badly with these shells and made many prisoners.

"To increase the confusion of the Allies the German chemists next worked up a deadly gas shell containing trichloromethyl chloroformate. These shells were introduced to trap gun crews in dugouts that could not be reached by direct shots and proved very effective for a time.

"The shell bursts anywhere near the gun and the gas is swept by the wind into the hiding place of the gunners, killing them. Another type of gas shell came later containing dichlorodiethylsulfide (mustard gas). As many as 50,000 of these shells were fired in a single night against the British at Ypres.

"This gas causes only irritation of the eyes at first, but in a few hours produces intense blistering, pain, discharge of the nose and vomiting, as well as coughing.

"After the first attack of this gas, the British devised a mask that would neutralize it.

"Checkmated at every point by protective masks of one kind after another, the German chemist now set about to produce a sneezing gas that would cause the victim to sneeze so violently that he could not keep a mask on his head, and would thus become exposed to the deadly vapor.

"This he accomplished through the use of phenylcarbylamine chloride, a lachrymator, and diphenyl-chloroarsine, mixed with other gases. Allied chemists again met this new type of shell with another type of mask filled with neutralizing chemicals.

"Incidentally Allied French and British chemists have developed gases of their own, which are said to be more efficient than the German gases and to cause more deadly effects.

"Both sides are now searching for a new type of gas that will be odorless, colorless and invisible; that will give no warning of its presence against which the soldier without a mask can protect himself. He will just breathe the air and drop. The chemist who can discover this gas has it within his power to win the war and go down to fame."

The Electric Mattress

AN ENGLISH physician has recently devised an electrically heated mattress for use by pneumonia patients. Wires enter through a terminal which is imbedded in the mattress so as not to be subject to wear or injury. That they may be thoroughly insulated, the resistance wires pass through glass beads and are also inclosed by flexible tubing of metal. The current is so controlled that there is no heat at the head, a moderate heat in the middle, and a maximum at the foot. By means of a variable resistance the heat can be regulated as desired.—From *Popular Mechanics.*

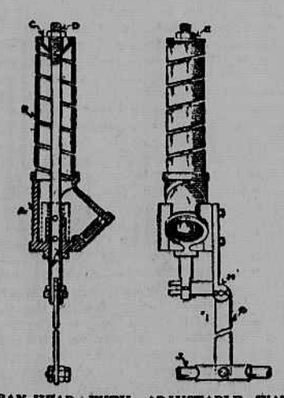
Functions of Marrow

A WRITER in "The London Lancet" suggests that marrow has a twofold function, not only to nourish the bone, but to supply a most important internal secretion. As bearing this out, he cites the mortality of 98 per cent in "primary" cases of amputation high up the thigh when the patient is in the prime of life, with "secondary" cases in which the mortality is only 60 per cent. In the secondary cases, where a diseased condition has existed for some time, there is less shock, according to the writer, because the system has become gradually accustomed to getting along without the marrow in the thigh bone, which contains one-sixth of the total amount in all the bones.

In the Great Workshop of Science

Adjustable Spray-Head for Cooling Tanks

A SPRAY HEAD equipped with convenient adjusting gear that can be actuated from the shore is being manufactured by the Yarnall-Waring Company, Chestnut Hill, Philadelphia. Re-



SPRAY-HEAD WITH ADJUSTABLE WATER APERTURE

ferring to the diagram produced herewith, *A* indicates the cast iron body of the device to which a 3.25-inch (8.2-cm.) bronze tube, *B*, is secured. A helical opening of coarse pitch is cut in the tube through which the sprayed water leaves the nozzle at an angle of 60 degrees to the axis of the tube. By moving the bar *J* to the left the cap *C* is pressed against the helically slotted tube, thus reducing the slot opening through which the water issues.

The manufacturer claims that the maximum cooling effect is obtained under all conditions of temperature and humidity, that the minimum loss of water by driftage due to wind results, and that a high efficiency is obtained at fractional loads by the use of this spray-head.—*Electrical World.*

An Electric Locomotive for Swiss Mountains

A NEW type of electric locomotive designed to meet extraordinary demands is described in "The Electric Railway Journal." It was supplied by a Baden company for the St. Moritz-Tirano line of the Bernina Railroad in Switzerland. This article states:

"The purchaser called for a locomotive capable of starting a 110-ton train on the most severe grades of this line and of maintaining a speed of 11.2 miles an hour on these grades. Moreover, the weight per axle was limited to 8.6 tons (17,200 pounds). The length of the line is 23 miles, 16¾ miles having an average grade of 7 per cent, as well as numerous curves with a minimum radius of 131 feet. Power is drawn from an overhead contact line at 750 volts, direct current.

"The motors on this locomotive are designed for use as generators on the downgrade trips, energizing the electric track brakes and providing rheostatic braking for the engines. The locomotive and cars are also fitted with Hardy vacuum brakes.

"It was first attempted to use two motors of 310 horsepower each for this service, but this was found undesirable, as in winter it is necessary to use this locomotive as a snowplough and to operate it at very low speed. The original plan was therefore changed, and four motors of 155 horsepower each were substituted to provide the desired low speed with all motors in series. The maximum speed of the train on level track is 31 miles an hour.

"The details of construction are shown in the general views, Figures 1 and 2. The central portion carries the track brakes, and is so arranged that it is always pulled by the leading motor truck, but is never pushed by the following truck. It carries eight magnets capable of exerting a total vertical force of 45,760 pounds. This system of braking the heavy engine on this road has proved very satisfactory, and despite the exceptionally trying conditions during the last winter, not a single accident has occurred.

"The motors are mounted in pairs on each truck. Each motor is geared to an intermediate shaft through gears with spring-mounted rims to absorb the shocks at starting. The power is transmitted to the driving wheels by means of connecting rods.

"The locomotive, completely equipped with snowplough and all necessary equipment and tools, weighs 46.86 tons, of which 28.16 tons is the weight of the mechanical parts and 18.7 tons that of the electrical equipment. In the middle of the locomotive, between the two equipment sections, is a freight compartment of 3.3 tons capacity, giving a maximum weight for traction of 50.16 tons.

"In power per ton of weight this new engine is said to be the most remarkable of any of the narrow-gauge type built so far. Its output on an hourly rating basis is 17 horsepower per ton of weight. The gauge is 39.37 inches (one metre)."

GENERAL STRUCTURAL DETAILS OF LOCOMOTIVE

How to Write Your Name Five Times at Once

TO CONSERVE his time a man whose monthly duty it is to sign 100,000 salary checks for a railway company employs a multiple penholder that permits his signature to be written five times in one operation. The apparatus differs from some others in that

the fountain pens are clamped to a pivoted rack that is mounted in a portable box resembling a suitcase. The cover, when opened flat on the desk top, holds a frame in which the vouchers are placed for signing. The operation of the device is like that of similar ones.—*Popular Mechanics.*

Handy Bins

CIRCULAR reinforced concrete bins for railway cooling stations, with the cylindrical wall forming the bin and its supporting tower, represent a new type of construction employed recently for stations requiring from 250 to 300 tons storage capacity. The type is limited practically to the smaller class of coaling stations, since track spacing will usually limit the diameter, and if the bin is made deep in proportion to its diameter the coal is likely to arch or choke, instead of flowing freely, says "The Engineering News-Record."

Advantages claimed for the circular design are economy of material, and low cost due to the use of special circular forms. This applies to the plain cylindrical shape. Where the design is complicated by interior elevator legs and a sand pocket, as in the stations mentioned, the cost is increased considerably, and may be about the same as for a rectangular design.

Two of these circular bin concrete coaling stations have been built for the St. Louis & San Francisco Railway.

Test for Rope

ROPE and binder twine are made from hard fibres, such as manila, sisal and New Zealand hemp, manila being the best for various reasons, especially its resistance to mildew. No test has been known whereby the purchaser might be certain of what he was buying. Mr. C. E. Swett, of Arthur D. Little, Inc., recently discovered a method of determining this with certainty, and the test has been adopted by the United States Bureau of Standards. It consists in freeing the rope from oil, soaking it for twenty seconds in a solution of bleaching powder acidulated with acetic acid, rinsing in water, then in alcohol and exposing for a minute to ammonia fumes. Manila fibre turns russet brown, all other rope fibres cherry red.—From *Safety Engineering.*

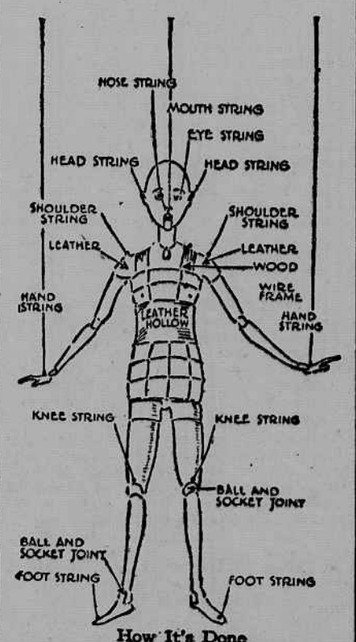
Horn Gaps on Telephone Lines

TO relieve the stresses on telephone lines paralleling its high tension transmission lines a Southern company installs horn gaps between the communication circuits and ground at frequent intervals. "The Electrical World" has this to say of the experiment:

"With this construction numerous 'safety valves' are offered to high voltage surges which may be induced in the lines, so there will not be the tendency to break down insulators. Furthermore, damage to telephone equipment and hazard to persons using it are thus reduced. This additional equipment is relatively inexpensive as the towers are grounded anyway and the horn gaps are easily installed."

Marionettes

TO DESIGN natural appearing puppets, according to a writer in "The Popular Science Monthly," requires a knowledge of anatomy, mechanics, art and the craft of the costumer. He tells how Tony Sarg, a New York illustrator,



How It's Done

If you are curious to see what makes the puppet act in such a life-like manner, examine this drawing. You will be able to see how its joints are arranged and how the strings the puppeteer so cleverly pulls are attached to the joints

conceived the idea of making puppets that would give really good imitations of human beings. The accompanying cut indicates the versatility of his three-foot manikins.

Fifty-four different types of airplanes and fifty-three kinds of motors are being made by the United States and her Allies. Germany relies chiefly on about half a dozen types of each.—*Gas Logic.*